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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,149	03/10/2004	Makoto Shizukuishi	0649-0948P	2035

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EXAMINER

NGUYEN, LUONG TRUNG

ART UNIT	PAPER NUMBER
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2622

NOTIFICATION DATE	DELIVERY MODE
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10/22/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/796,149	Applicant(s) SHIZUKUISHI, MAKOTO	
	Examiner LUONG T. NGUYEN	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 5,6,10,11,13,14,16,17 and 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,9 and 12 is/are rejected.
- 7) ☒ Claim(s) 7,8,15,18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>2/25/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Species II, illustrated in Figures 10-15, which reads on claims 1-4, 7-9, 12, 15 and 18 in the reply filed on 1/08/2008 is acknowledged.
2. Claims 5-6, 10-11, 13-14, 16-17 and 19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1/08/2008.

Response to Arguments

3. Applicant's arguments, see Remark, filed 5/27/2008, with respect to the rejection(s) of claim(s) 1, 4, 12 under 35 USC 102 (b) as being anticipated by Tabei (US 4,514,755) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kobayashi et al. (US 6,750,911) and Tabei.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,750,911) in view of Tabei (US 4,514,755).

Regarding claims 1, Kobayashi et al. discloses a CCD color solid-state image pickup device (CCD imager 20, figure 2, column 3, lines 59-67) comprising:

a plurality of light-receiving sections (CCD imager 20, figure 2, column 3, lines 59-67) arranged on the surface of a semiconductor substrate;

a vertical transfer path (vertical transfer 20b, figure 2, column 4, lines 22- 40) by way of which signal electric charges stored in electric charge storage sections of the respective light-receiving sections are read and transferred to a horizontal transfer path; and signal electric charges stored in the respective electric charge storage layers are read independently to the vertical transfer path (vertical transfer 20b, figure 2, column 4, lines 22- 40).

Kobayashi et al. fails to specifically disclose wherein the electric charge storage section of each of the light-receiving sections has a plurality of electric charge storage layers which are provided in a depthwise direction of the semiconductor substrate with potential barriers interposed therebetween.

However, Tabei discloses a solid-state color imager, which discloses wherein the electric charge storage section of each of the light-receiving sections has a plurality of electric charge storage layers which are provided in a depthwise direction of the semiconductor substrate with potential barriers interposed therebetween (figures 2, 6-11d shows electric charge storage layers 103, 104 are provided in a depthwise direction; and noted that since layers 103 and 104 detect different colors, a potential barrier is interposed between layers 103 and 104). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

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modify the device in Kobayashi et al. by the teaching of Tabei in order provide a solid-state color imager which can be produced color signals without the need of multicolor filters (column 4, lines 42-45).

Regarding claim 4, Tabei discloses wherein the depths of the respective electric charge storage layers are set in accordance with wavelengths of incident light to be detected (figures 11a-11d, column 11, lines 20-42).

Regarding claim 12, Tabei discloses wherein the light-receiving sections are arranged in a square solid pattern on the surface of the semiconductor substrate (figure 6).

6. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,750,911) in view of Tabei (US 4,514,755) further in view of Merrill (US 7,132,724).

Regarding claim 2, Kobayashi et al. and Tabei fail to disclose wherein an electric charge path, which causes electric charges stored in the electric charge storage layers to migrate to the surface of the semiconductor substrate and is formed from a heavily-doped impurity region, is provided in an electric charge storage layer from among the plurality of electric charge storage layers, the electric charge storage layer being provided in the semiconductor substrate.

However, Merrill discloses an electric charge path, which causes electric charges stored in the electric charge storage layers to migrate to the surface of the semiconductor substrate and

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is formed from a heavily-doped impurity region, is provided in an electric charge storage layer from among the plurality of electric charge storage layers, the electric charge storage layer being provided in the semiconductor substrate (region 134 provides access to red detector layer 116, region 136 provides access to green detector layer 126, figure 9, column 8, line 8 – column 9, line 21). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Kobayashi et al. and Tabei by the teaching of Merrill in order to provide a complete-charge transfer vertical-color-filter detectors which has advantage of minimizing or eliminating the need for interpolation as require by the Bayer patterns since each pixel location in the array measures three spectral components at the same location (column 4, line 64 - column 5, line 1).

Regarding claim 3, Kobayashi et al. and Tabei fail to disclose wherein a concentration gradient is imparted such that the dopant concentration of the electric charge storage layers formed as heavily-doped impurity regions and the dopant concentration of the electric charge path continually connected to the electric charge storage layer increase as the electric charge storage layer and the electric charge path approach the vertical transfer path.

However, Merrill discloses wherein a concentration gradient is imparted such that the dopant concentration of the electric charge storage layers formed as heavily-doped impurity regions and the dopant concentration of the electric charge path continually connected to the electric charge storage layer increase as the electric charge storage layer and the electric charge path approach the vertical transfer path (figure 9, column 8, lines 8-67).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Kobayashi et al. and Tabei by the teaching of Merrill in order to provide a complete-charge transfer vertical-color-filter detectors which has advantage of minimizing or eliminating the need for interpolation as require by the Bayer patterns since each pixel location in the array measures three spectral components at the same location (column 4, line 64 - column 5, line 1).

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (US 6,750,911) in view of Tabei (US 4,514,755) further in view of Stavely (US 6,535,249).

Regarding claim 9, Kobayashi et al. and Tabei fail to disclose wherein on-chip light gathering optical systems are provided on upper portions of the respective light-receiving sections, and one opening of each light-shielding film corresponds to each of the light-receiving sections. However, Stavely teaches a digital camera optical system which comprises microlens 468 is mounted on the upper portion of electronic sensor 416 for gathering image light 422 and focuses it onto the smaller width 488 of the light sensitive region 454 via an opening of light shields 440, 446, figure 8, column 5, lines 40-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Kobayashi et al. and Tabei by the teaching of Stavely in order to focus and direct image light toward the pixels in an electronic sensor (column 3, lines 18-20).

Allowable Subject Matter

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8. Claims 7-8, 15, 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571) 272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LTN
10/13/08

/LUONG T NGUYEN/
Examiner, Art Unit 2622

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